

# AGRICULTURAL GUIDE

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Corn harvesting

## Measuring and reducing corn harvesting losses



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Bushels left behind in the field when corn is combined represent a loss of profits. Combine losses cannot be reduced to zero, but skillful operators can reduce losses to an acceptable level without affecting the rate of combining.

Until corn harvesting losses can be identified and measured, operators have no way of knowing whether their losses are at an acceptable level. This guide sheet lists the major sources of loss.

**Pre-harvest loss.** Some crop losses are caused by lodging. Appearing as whole ear losses, they increase as the season progresses, and they are outside the operator's control at harvest time. Average pre-harvest losses should be less than 1 percent of total crop yield. This loss can go much higher in adverse crop years or when harvest is delayed.

**Header ear loss.** Driving at a ground speed that is too fast or too slow, driving off the row, or operating the header too high may result in lost whole or broken ears. Losses average 3 to 4 percent of the total crop yield. With proper machine operation and adjustment, you can hold losses to 1 percent.

**Header kernel loss.** Some kernels are shelled out and lost by the header at the gathering snouts, snapping bars, and snapping rolls. These losses average about 0.6 percent. With proper adjustment and machine operation and good field conditions, you can hold these kernel losses to about 0.4 percent.

**Combine cylinder loss.** Insufficient shelling action causes some kernels to remain on the cob as they pass through the machine. With the correct cylinder or rotor speed and correct concave clearance adjustment, this loss should not exceed 0.3 percent. Correct adjustment results in few or no broken cobs with no

kernels attached to them. Avoid too vigorous shelling action which results in excessive kernel breakage.

**Combine separation loss.** Some kernels may pass over the sieves and out of the combine. With correct sieve and wind adjustment, this loss should be held to 0.1 percent of the total crop yield.

### How to measure harvest losses

Checking for combine losses should take about 15 minutes. Corn saved by finding and correcting problems will more than pay for this time.

Determine losses by counting the number of full size ears (approximately  $\frac{3}{4}$  pound) or the equivalent weight in smaller ears found in  $\frac{1}{100}$  acre. Each full-size ear represents about 1 bushel per acre loss.

Count the kernels per 10 square feet to determine kernel losses. Two kernels per square foot equals 1 bushel per acre loss.

Enter ear and kernel counts in Table 2 and Table 4 respectively. After you complete these tables, they will show the total harvest loss as well as the loss at each section of the machine. The results will identify the areas where combine adjustments need to be made.

**Procedure.** First, disconnect the straw spreader or chopper. Stop the combine where the crop is representative of the entire field. Shut off the header. Back up a distance equal to the length of the combine, and shut off the combine.

Determine the total ear loss (step 1) and the total kernel loss (steps 4, 5, and 6) for the combine. If the total loss for the machine is 3 to 5 percent of the total crop yield, keep on harvesting. If the loss is greater, find the source of loss to determine where adjustments are needed. Figure 1 shows where to measure the corn harvest losses.

#### Total ear loss (pre-harvest and header)

**Step 1:** Step off the required distance *behind the combine*. The length of corn rows for this  $\frac{1}{100}$  acre

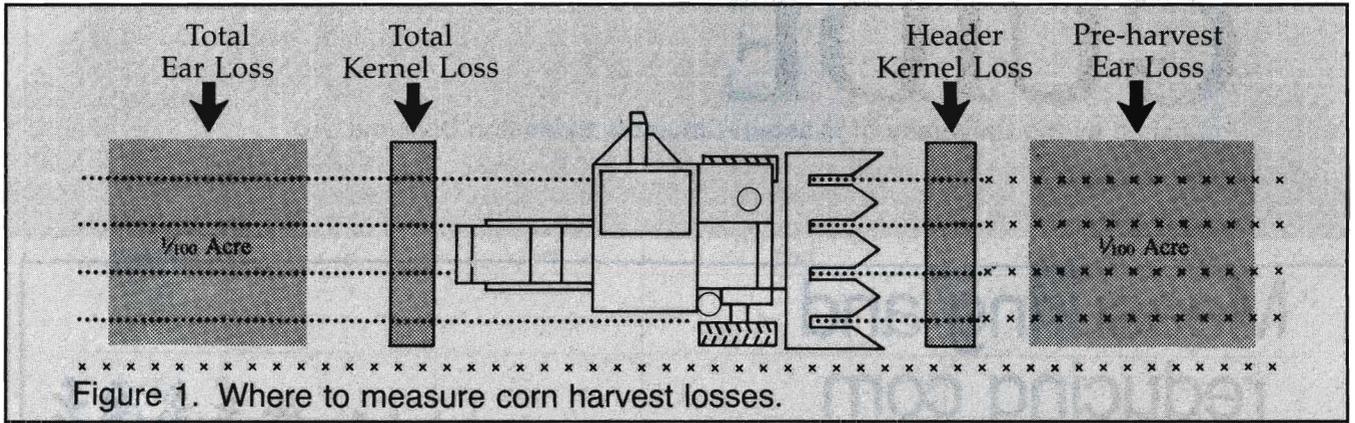


Figure 1. Where to measure corn harvest losses.

Table 1. Row length in feet per 1/100 acre.

Row width (inches)	One row	Two rows	Three rows	Four rows	Six rows	Eight rows	Twelve rows
20	262	131	87.3	65.5	43.6	32.7	—
28	187	93.5	61.3	46.7	31.1	23.3	—
30	174	87	58	43.6	29	21.8	14.5
36	145	72.5	48.3	36.2	—	—	—
38	138	69	46	34.5	—	—	—
40	131	65.5	43.6	32.7	—	—	—
42	124	62	41.3	31	—	—	—

Table 2. Ear loss data table.

	Number of ears (one 3/4-pound ear = 1 bushel/acre)	Bushels/acre
Total ear loss (Step 1)		
Pre-harvest ear loss (Step 2)		
Header ear loss (Step 3)		

varies with row width and number of rows covered by the corn head. (See Table 1.) Gather and count all the whole and broken ears in these rows. Record this number in Table 2. Each 3/4-pound ear or the equivalent weight in smaller ears represents 1 bushel per acre loss. Three 1/2-pound ears represent 2 bushels per acre.

**Step 2:** Step off the required distance *in the standing corn*. (See Table 1.) The combine header width times the distance stepped off represents 1/100 acre. Gather and count all the loose and lodged ears in these rows. Record this number in Table 2.

#### Header ear loss

**Step 3.** Subtract the pre-harvest ear loss from the total ear loss to determine header ear loss. Record this number in Table 2.

#### Total kernel loss (header and separation loss)

Count the loose kernels on the ground and those still attached to threshed cobs in a 10-square-foot area for each row behind the combine to determine total kernel loss. The procedure is outlined in steps 4, 5, and 6. To obtain the 10-square-foot area, make a rectangle with plastic clothes line and four wire pegs. The area should have width equal to the planted row width. Use Table 3 to determine length.

**Step 4:** Place the frame over each row behind the machine. Count the number of loose kernels on the ground within the frame. Record this number in column 3, Table 4. This figure represents the total loose kernel loss (header loss plus separating loss).

**Step 5:** Before moving the frame to the next row

**Table 3. Row length for 10-square-foot-frame.**

Row width (inches)	Row length (inches)
20	*
28	51.5
30	48
36	40
38	38
40	36
42	34

\*Use same frame as for 40-inch rows, but place frame over two rows at a time.

behind the machine, also count the number of kernels still attached to the threshed cobs. Ignore small kernels at the butt or tip end of cob. Record this figure in column 2, Table 4. It represents the cylinder loss.

**Step 6:** For each row, add columns 2 and 3 of Table 4. Divide by 20 to convert the kernel loss to bushels per acre. Record the result in column 1, Table 4. The average of the values in column 1 gives the combine's total kernel loss in bushels per acre.

#### Header kernel loss

**Step 7:** Place the frame over each harvested row in front of the machine where the separator has not yet passed. Count the loose kernels within the frame, and record the number in column 4, Table 4. It represents the header kernel loss.

#### Separation kernel loss

**Step 8:** For each row, subtract column 4 from column 3, and record the number in column 5. The result represents the separation kernel loss.

### Tips for keeping losses low

The best guide for correct combine adjustments is your **operator's manual**.

Remember that gathering head losses usually represent the greatest source of loss for the combine as well as the picker.

- ✓ Run the combine engine at its rated engine speed.
- ✓ Use a ground speed of 2.8 to 3.0 miles per hour. (Do not regulate ground speed by reducing engine speed.) To determine ground speed, count how many 3-foot steps you can take in 20 seconds while walking beside the machine. Divide this number by 10 to get the ground speed in miles per hour.
- ✓ Close the stripper plates or snapping bars only enough to prevent ears from passing through.
- ✓ The chain flights over the stripper plates should extend beyond the edge of the plates about ¼ inch.
- ✓ Ears should be snapped near the upper ⅓ of the snapping roll.
- ✓ Drive accurately on matched rows, spaced according to your harvesting machine.
- ✓ Gathering snouts should float on the ground, and gathering chains should be just above the ground.
- ✓ Measure losses and make corrective machine adjustments whenever crop conditions change.

Table 4. Kernel loss data table.

<b>Column</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<i>Row number</i>	<i>(Step 6) Total kernel loss* per acre</i>	<i>(Step 5) Cylinder loss Kernels on cob per 10 square feet</i>	<i>(Step 4) Header &amp; separation loss Kernels per 10 square feet</i>	<i>(Step 7) Header loss Kernels per 10 square feet</i>	<i>(Step 8) Separation loss Kernels per 10 square feet</i>
1					
2					
3					
4					
5					
6					
7					
8					
<i>Average loss</i>					

\*Divide by 20 = bushels per acre